SIEGE MUSEUM ASSESSMENT

15 WEST BANK STREET
PETERSBURG, VIRGINIA

MOSELEY ARCHITECTS

RICHMOND, VIRGINIA — STRUCTURAL ENGINEER

COMMONWEALTH ARCHITECTS

RICHMOND, VIRGINIA — ARCHITECTURAL CONSULTANT

LUCAS & ASSOCIATES

MIDLOTIAN, VIRGINIA — ROOF CONSULTANT

JUNE 15, 2015

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MOSELEY ARCHITECTS

CHARLOTTE
FAIRFAX
HARRISONBURG
RALEIGH-DURHAM
RICHMOND
VIRGINIA BEACH
WARRENTON

June 15, 2015

RE: Siege Museum
Petersburg, Virginia
Condition Assessment

Mr. Steven W. Hicks
City of Petersburg
Dept of Public Works & Utilities
103 West Tabb Street
Petersburg, Virginia 23803

Dear Mr. Hicks:

In accordance with our proposal dated February 9, 2015, Moseley Architects was engaged by the City of Petersburg to perform a condition assessment of the Siege Museum building located at 15 West Bank Street. We performed on-site observations on April 7, 2015. We were assisted with access to the building by City of Petersburg personnel.

The building was originally known as The Exchange Building and was constructed between 1839 and 1841. It is listed in the National Register of Historic Places and is designated a National Historic Landmark.

The following consultants were engaged by Moseley Architects to participate in this investigation:

- Commonwealth Architects – Historic Consulting
- Lucas & Associates – Roof Consulting

Additionally, Tidewater Preservation, Inc. provided carpenters experienced at restoration work to remove and replace existing materials to allow observation of concealed conditions at the cupola exterior walls.

Based on the findings of the field investigations, individual reports were prepared addressing Structural, Architectural, and Roofing conditions and recommendations.

These reports are enclosed. There is some overlap of information within the reports, but the assessments and recommendations are consistent.

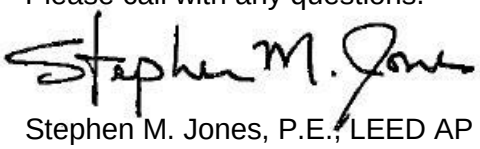
After the City has had the opportunity to review the reports, we will be happy to meet and discuss any or all of the issues that are addressed, and to assist the City in assigning priorities to the rehabilitation tasks that are recommended, and ultimately developing a proposed scope of work. At that point we will provide a proposal to prepare Construction Documents for the agreed upon scope.

We consider the structural recommendations to all be high priority, as is the re-roofing. Certain waterproofing measures, although not directly related to structural adequacy, will serve to prevent structural deterioration, and may be considered high priority, dependent on budget constraints. The Architectural report is comprehensive and contains a number of recommendations that vary in level of urgency and priority. We anticipate discussion regarding these items when establishing a scope of work and a budget for construction.

Although it was not included in the original scope of work for this project/report, we observed the condition of the existing mechanical systems as part of our overall building evaluation. In general, the existing HVAC systems have reached or are approaching the end of their expected useful service life. There are multiple systems, and a variety of systems, that do not appear to be operating in a coordinated manner to provide consistent temperatures and humidity levels throughout the building. This condition, along with the existing breaches in the building envelope, has resulted in interior environmental conditions that are not suitable for the intended use of this facility. Design and installation of a new HVAC system should be considered in conjunction with the structural and envelope improvements in order to provide acceptable temperature, humidity and indoor air quality conditions for the museum's occupants and visitors, and to avoid conditions detrimental to the interior building finishes and the historic items housed within the building.

We truly appreciate the opportunity to provide these services for the City of Petersburg, and to be involved in maintaining such an important and historic structure. We look forward to the next phase of the Project.

Please call with any questions.



Stephen M. Jones, P.E., LEED AP
Vice President

534545

Part 1: Existing Condition Analysis

A. **Executive Summary**

The City of Petersburg, recognizing the need to continue to evaluate and improve the physical conditions of the Siege Museum, has contracted Moseley Architects, and through Moseley Architects, and Commonwealth Architects to analyze and propose conservation and rehabilitation recommendations for the building. With the understanding that Siege Museum (historically known as the Exchange Building or the Merchant's Exchange Building) is individually listed on the Virginia Landmarks Register (DHR# 123-0051), The National Register of Historic Places, and is a National Historic Landmark, all proposed work must comply with the Secretary of the Interior's Standards for Rehabilitation. To that end, an existing conditions assessment has been conducted to guide that work.

We are submitting a report that evaluates both exterior and interior elements. This includes the general building information, existing conditions analysis for the exterior and interior, recommendations for rehabilitation for the exterior and interior, and a summary table incorporating all recommendations.

Report Organization

The overall report is divided into two sections. The report begins with an introduction, and proceeds part 1, "Existing Conditions Analysis & Rehabilitation Recommendations," is the longest and most detailed section of the report. This section examines The Siege Museum's exterior, and interior conditions.

This investigation was conducted in accordance with guidance provided by the National Park Service's *Preservation Brief 43: The Preparation and Use of Historic Structures Reports.* The architectural section concludes with a summary table prioritizing rehabilitation recommendations

Part 2 contains a summary of rehabilitation recommendations, including specific maintenance, alteration, and modification recommendations, and a master table prioritizing these recommendations. The table names and prioritizes each of the problems identified during the survey and indicates the urgency of the repairs in terms of months or years. Problems are prioritized on a four point scale as defined below:

- Priority 1 indicates that the condition requires immediate attention because it is causing active deterioration and threatens the integrity of the structure, or that poses a health and safety risk.
- Priority 2 refers to a condition that should be addressed within a year, but only after the first priority needs have been met.
- Priority 3 refers to a low priority issue that does not threaten the integrity of the historic building. Usually it pertains to an aesthetic problem which should be scheduled as time and budget permit.
- Priority 4 refers to materials, features or systems that require routine inspection or show signs of

early deterioration and may require action in the next ten years.

B. Description of Methodology

After the initial request for services the project began with a series of site investigations conducted to document, evaluate, and analyze the Siege Museum. The museum was systematically photographed and existing conditions carefully noted.

C. Project Team Organization

The documentation, analysis, and recommendations were completed by Commonwealth Architects. Bryan Clark Green inspected and photographed the building, wrote the existing conditions analysis and architectural recommendations, with the assistance of Lisa Bricker. Moseley Architects arranged for a site visit that included representatives from Moseley Architects, Lucas & Associates Roofing Consultants, and Commonwealth Architects who visited the site and each of whom produced their individual structural engineering, roof analysis, and architectural analysis portions of this report.

Existing Condition Analysis

The Siege Museum has been relatively well maintained over the years and is managed by dedicated staff members and volunteers. The inspection this historic site revealed a number of conditions that require attention.

The problem of water infiltration in the Siege Museum is a constant. The Siege Museum is characterized by gutters that have rusted through and are no longer functioning. The replacement of the deteriorated gutters and the rusting downspouts with new copper gutters and downspouts will help to eliminate the moisture problems and will protect the historic building fabric. Addressing the permeability of the site and the installation of subterranean drainage along the north elevation of the building will also promote the mediation of the water infiltration. The water infiltration issue is echoed through the temperature and relative humidity readings taken during the site visit. The humidity levels were at their greatest in the sub-basement with a reading of 78.0% relative humidity and the lowest reading on the main floor of the museum at 51.8% relative humidity. *Water in Buildings, An Architect's Guide to Moisture and Mold* by William B. Rose states that during summer months a range of 50-60% relative humidity is acceptable and a wintertime range of 30-40% relative humidity is acceptable. While much of the main floor and second floor are within the acceptable range for summer (note: field investigation was undertaken on April 7, 2015 on a spring mild day, not during summer) the ground floor and sub-basement are well above the acceptable range. The majority of the museum's storage is located on the ground level in conditions not conducive to the conversation of museum collections. In an effort to conserve the artifacts and documents within the collection, the water infiltration issues need to be resolved quickly. See Appendix A beginning on page 18 for drawings outlining relative humidity and temperature in the various spaces in the Siege Museum.

Further compounding the moisture issues are the issues caused by a mechanical system that is leaking, and may be at the end of its expected service life. This was not an anticipated finding of this report, and while, as expected, the roof has surpassed its expected service life, a considerable portion of the interior moisture damage appears to be caused by leaking and condensing mechanical equipment. The Siege Museum requires a new HVAC system. The systems should be carefully designed to be as unobtrusive as possible, and should provide the recommended environmental conditions for the museum settings.

Existing Conditions

The Siege Museum is located at 15 West Bank Street in downtown Petersburg. The building was constructed between 1839 and 1841 and was first known as the Exchange Building. Built in the Greek Revival style, the building has a commanding presence. Constructed to serve as a trading center, the ground floor of the building was originally characterized by an open arcade. The arcades were used as an open air market, where goods were displayed, traded, and purchased. The interior spaces of the building's upper floors were used for offices, public meetings, and auctions. In later years, the building housed a number of banks and served a variety of functions before being purchased by the City of Petersburg in 1927. The city renovated the building to serve as a police court, and in the course of the renovations, the basement arcades were enclosed. The building functioned as a center of police operations in the city until 1969. The Exchange Building continues to be owned by the City of Petersburg, and has been rehabilitated to serve as the Siege Museum. The building was listed in the Virginia Historic Landmarks Register in 1968, and in the National Register of Historic Places in 1969. In 1972, the building was designated a National Historic Landmark.

Site

The Siege Museum is located on the north side of Bank Street. The site slopes from a high point on the north side of the lot down to the street. The Museum is placed at the southern portion of the site, and the property is surrounded by buildings on all sides. The south portico steps are placed directly adjacent to the city sidewalk along Bank Street, and the building is surrounded by concrete and asphalt surfaces. Small planting beds are located at grade on the east and west sides of the south portico, and contain medium-sized ornamental trees. A surface parking lot is placed at the north side of the building, and is accessed by drives on the east and west sides of the building.

The parking area on the north side of the building is paved with asphalt that is exhibiting numerous cracks. Handicap parking areas are not well marked, and the use of the east and west drives for entrance and egress are not designated. The paved parking area slopes significantly down to the north wall of the building, and there is no drain or grade change to direct water runoff. Wide gaps are present between the base of the north elevator tower and the surrounding asphalt and concrete surfaces, and the concrete landing at the north entrance door is cracked. Small sand bags have been placed at the north and east walls of the elevator tower as a means to mediate the wall infiltration, but are failing.

A concrete sidewalk and low curb remain along the building's east elevation. The drive on the west elevation has been paved, and the asphalt surface extends in an unbroken plane to the base of the building.

Exterior

The exterior of the Siege Museum is distinguished through the use of the bold Greek Revival style. The two-story

building, rectangular in plan, is placed on a high basement. The height of the building is accentuated by the use of a monumental portico and a dramatic flight of granite steps. A metal-clad dome and octagonal cupola crown the structure.

Roof:

Figure 1.1: Roof, Siege Museum. Dome roof and copula. (Photograph 7 April 2015)

The metal roof material of the main building, the dome, and the cupola is composed of painted terne; the terne is deteriorated and requires replacement. The windows on the cupola have been covered over with plywood boards. Gutters and downspouts are used around the perimeter of the roof, and are severely deteriorated.

Figure 1.2: Roof, Siege Museum. Cupola wall cavity detail.(Photograph 7 April 2015)

Figure 1.3: Roof, Siege Museum. Detail of roof surface. Note the flaking roof coating and rust beneath.(Photograph 7 April 2015)

The building's exterior walls are covered in stucco that is scored to resemble stone, and are characterized by wood double hung windows on all elevations. The windows are trimmed by stone sills and lintels, and a stone belt course circles the structure. A modern elevator tower, added in the 1980's, is placed on the north elevation and is linked to the building by a glass-enclosed connector.

South Elevation:

Figure 1.4: South Elevation, Siege Museum. (Photograph 7 April 2015)

The south elevation of the Siege Museum faces Bank Street and was designed to serve as the main entrance elevation of the building. Currently, the main entrance to the Siege Museum is the ground floor

entrance to the east of the portico. The rear elevator tower serves as the handicap entrance. The five-bay elevation is dominated by a monumental two-story portico. The portico is composed of four Doric columns that support a tall entablature detailed by triglyphs and metopes. A low pediment caps the composition. A flight of wide granite steps are used to access the portico, and pilasters are used at the corners of the building. Double hung windows light the first floor and the center three bays of the second floor. Small circular windows, set in decorative wreaths, are placed in the south elevation's entablature. Double wood doors are located at the basement level on each side of the portico. A modern, glass storefront entry was installed in the east basement entry. The double wood entrance doors to the main level of the building are capped by a large transom. Double pocket doors are placed to secure the main entrance and are framed by a Greek Revival surround. The portico is floored with large stone blocks; the mortar in the joints between the stones has been patched with an inappropriate mortar and is deteriorating, allowing water to penetrate to the rooms below the portico. The stucco coating on the portico columns is deteriorating. Figures 1.5 and 1.6 show the progressive deterioration of stucco on the portico columns between 2004 and 2015.

Figure 1.5: South Elevation, Siege Museum. Handrail detail. (Photograph 8/10 October 2004)

Figure 1.6: South Elevation, Siege Museum. Handrail detail. (Photograph 7 April 2015)

East and West Elevation:

The east and west elevations of the Siege Museum are similar in configuration; each elevation is distinguished by a central large arched window. The brick elevations have received a coat of paint, but in many places the paint is flaking or missing. Biological growth is present on both elevations. Paired, double hung windows are located at the basement level, and small rectangular windows are set in the entablatures of the east and west elevations. The sills of all

windows do not promote proper drainage of water away from the windows. This is promoting deterioration of the window sills and frames. The glazing compound is in poor condition and is missing from many windows. Basement doors are located at grade on each elevation. The paving of the west drive has partially filled in the ends of the west elevation's downspouts. See images 1.12 and 1.13 for a comparison of damage between 2004 and 2015. Notice the progression of the rust stains, spalling concrete, and biological growth on the west elevation of the modern elevator tower.

Figure 1.7: East Elevation, Siege Museum. Cornice Detail. (Photograph 7 April 2015)

Figure 1.8: East Elevation, Siege Museum. (Photograph 7 April 2015)

Figure 1.9: East Elevation, Siege Museum. (Photograph 7 April 2015)

Figure 1.10: West Elevation, Siege Museum. (Photograph 7 April 2015)

Figure 1.11: West Elevation, Siege Museum. (Photograph 7 April 2015)

Figure 1.12: West Elevation, Siege Museum. (Photograph 8/10 October 2004)

Figure 1.13: West Elevation, Siege Museum(Photograph 7 April 2015)

North Elevation:

Figure 1.14: North Elevation, Siege Museum. (Photograph 7 April 2015)

The north elevation is simple in character. Two levels of windows are present above the first floor's stone belt course, and a central gable is placed at the center of the roofline. The cornice is in poor condition. Irregularities in the stone belt course and seams in the roof's eave suggest that a portico or porch may have been located on the north elevation. In-filled openings are present at the ground floor level. A modern elevator tower was added to the north elevation in the 1980's. Clad in stucco, the elevator tower serves the three main levels of the building. The elevator tower is joined to the building by a three-level glass and stucco connector. An accessible entrance is located at grade on the west side of the connector. The elevator tower and connector are marked by significant rust stains and numerous cracks are visible in the stucco. Spalling on concrete is occurring in several places. See figures 1.16 and 1.17 for a comparison of the sub-basement hatch between 2004 and 2015.

Figure 1.15: North Elevation, Siege Museum. Note the biological growth on the wall and the slope of the asphalt lot sloping toward the building. (Photograph 7 April 2015)

Figure 1.16: North Elevation, Siege Museum. (Photograph 8/10 October 2004)

Figure 1.17: North Elevation, Siege Museum. (Photograph 7 April 2015)

Figure 1.18: North Elevation, Siege Museum. Cornice Detail. (Photograph 7 April 2015)

Interior

The Siege Museum consists of three floors of occupiable space, a sub-basement, and an unfinished attic. Standing on the ground floor and the below-grade sub-basement, the interior of the Siege Museum's upper two floors is organized around a central two-story rotunda. The rotunda is capped by a dome and was designed to be lit by the building's octagonal cupola. The cupola windows, however, have been covered by boards due to damage and persistent leaks. A series of square columns supports the rotunda dome; the columns are connected by a second floor gallery that encircles the space. A variety of rooms surround the central rotunda on the main floor and second floor. The main floor rooms north of the rotunda are used as museum space and staff office space. Two small restrooms and a janitor's closet are also located to the north of the rotunda. The restrooms are not handicap accessible. Water damage and efflorescence are present in the southwest corner of the janitor's closet.

Museum displays are situated in the central rotunda and the large rooms to the south of the rotunda on the main floor. The second floor rooms are used for meeting space, storage space, and include a small theater for visitors.

Figure 1.19: Second floor, Siege Museum. (Photograph 7 April 2015)

Figure 1.20: Second floor, Siege Museum. (Photograph 7 April 2015)

Figure 1.21: Second floor, Siege Museum. (Photograph 8/10 October 2004)

Figure 1.22: Second floor, Siege Museum. (Photograph 7 April 2015)

Figure 1.23: Second floor, Siege Museum. (Photograph 8/10 October 2004)

Figure 1.24: Second floor, Siege Museum. (Photograph 7 April 2015)

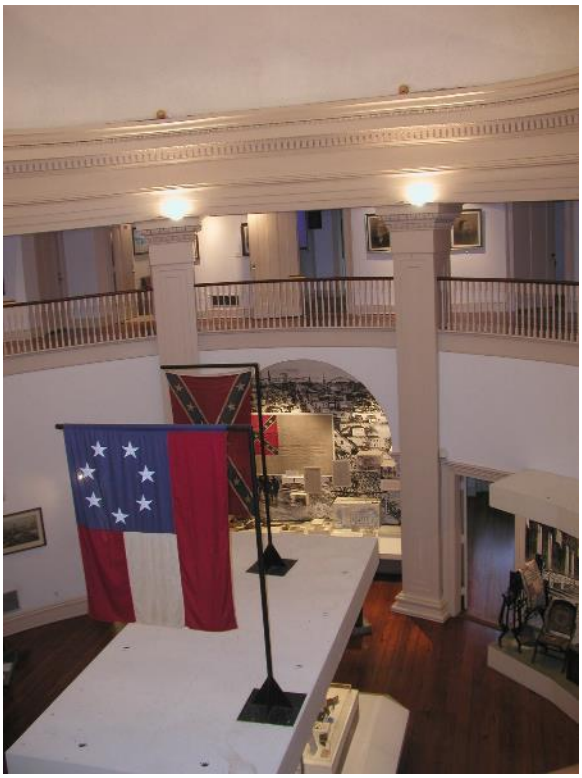


Figure 1.55: Second floor, Siege Museum. (Photograph 8/10 October 2004)

Figure 1.26: Second floor, Siege Museum. (Photograph 7 April 2015)

Figure 1.27: Main floor, Siege Museum. (Photograph 7 April 2015)

The interior spaces of the Siege Museum are finished with a variety of materials. Original wood floors remain visible in portions of the building, including the central rotunda, while carpet has been installed in a number of offices and secondary rooms. Plaster ceilings are located in several of the first floor spaces and modern dropped ceilings have been installed in the offices and storage areas. Decorative wood panels remain below some of the building's windows, and may have been a consistent feature throughout the building's interior. The second floor mechanical room appears to have been little altered over the years and may provide a valuable record for the original decorative treatments of the building. Plaster damage due to water infiltration is evident at the rotunda gallery and on the plaster trim that edges the rotunda dome. The roof and windows in the elevator connector have deteriorated and have allowed water infiltration, damaging surfaces and finishes.

Figure 1.28: Main floor, Siege Museum. (Photograph 7 April 2015)

Figure 1.29: Main floor, Siege Museum. (Photograph 7 April 2015)

Figure 1.30: Main floor, Siege Museum. (Photograph 8/10 October 2004)

Figure 1.31: Main floor, Siege Museum. (Photograph 7 April 2015)

The ground floor of the Siege Museum is currently undergoing renovation to include a new gift shop, orientation theater, and visitor restrooms. A main entrance for the museum will be provided at the south basement door, which is positioned on the east side of the portico.

Figure 1.32: Ground floor, Siege Museum. (Photograph 7 April 2015)

Figure 1.33: Ground floor, Siege Museum. (Photograph 7 April 2015)

Figure 1.34: Ground floor, Siege Museum. (Photograph 7 April 2015)

Figure 1.35: Ground floor, Siege Museum. (Photograph 7 April 2015)

The sub-basement is located below the ground floor level and is not occupiable space. The interior of the sub-basement is characterized by brick and stone foundation walls; a series of structural brick arches support the building above. The sub-basement will be used to house the HVAC ducts for the renovated basement spaces. Water infiltration is evident at the north wall of the basement, and several of the wood joists and beams at the north side are severely deteriorated. Several lines of abandoned wiring and conduit remains throughout the sub-basement. Severe mortar loss is present at the structural brick arches.

Figure 1.36: Basement, Siege Museum (Photograph 7 April 2015)

Figure 1.37: Basement, Siege Museum. (Photograph 7 April 2015)

Figure 1.38: Basement, Siege Museum. Biological growth. (Photograph 7 April 2015)

Figure 1.39: Basement, Siege Museum. Note the mortar piled against the base of the arches. (Photograph 7 April 2015)

Climate Control and Environment

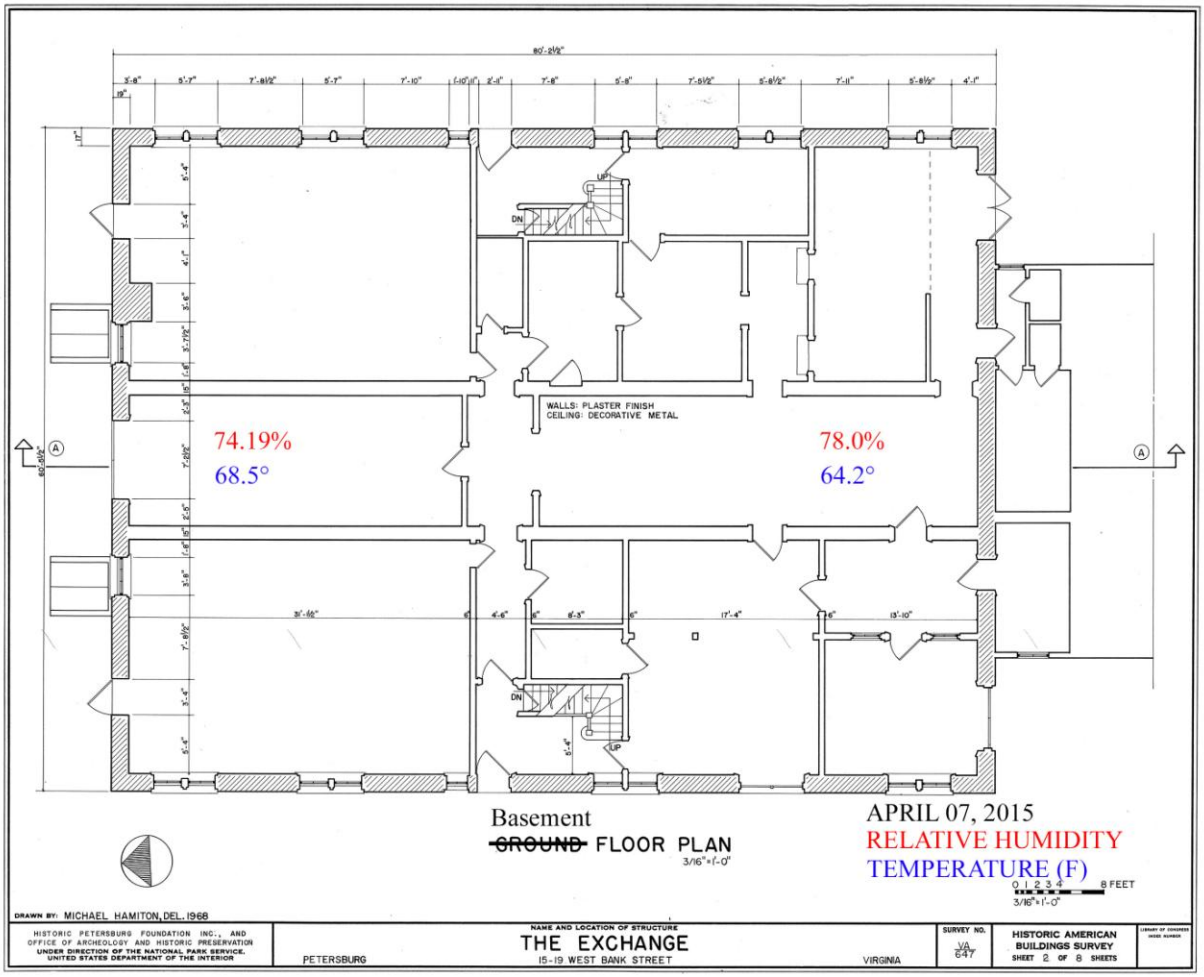
The heating and air conditioning system in the Siege Museum is approaching the end of its expected life span. Numerous grilles and vents are located along the walls of the rotunda gallery, and several supply diffusers are positioned around the base of the dome. Water damage is evident around several of the system's grilles and vents. Condensate is present in the system located in the current movie theater. This is potentially the cause of the water damage located beneath this area of the main floor. Through-wall fan coil units are located at the elevator tower connector. The systems have been augmented by a window-mounted air conditioner unit, located on the connector's top level.

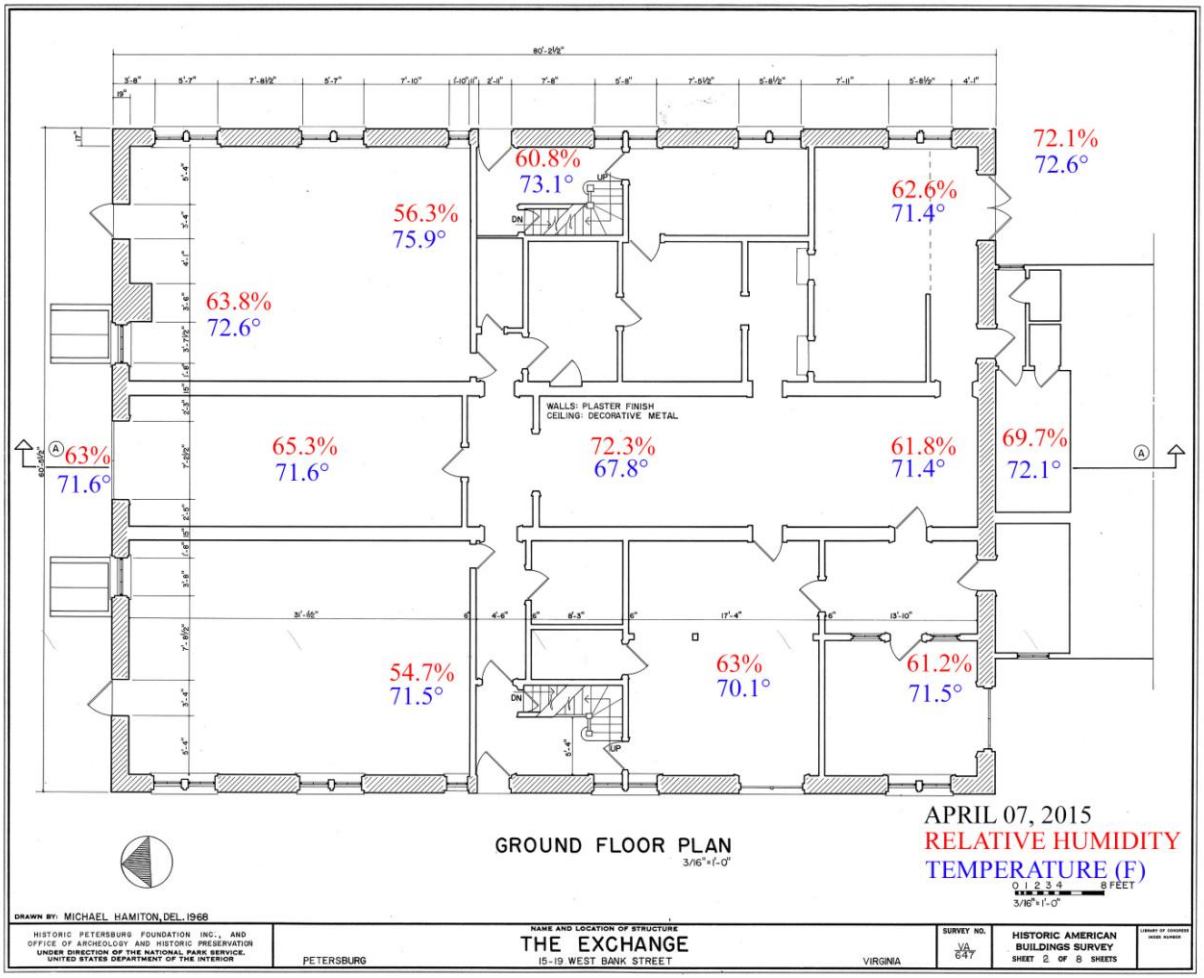
Emergency Preparedness

There is no emergency preparedness plan for the Siege Museum. The building is not protected by a sprinkler system, although there is a fire detection system and a security system. Hand-held fire extinguishers are located throughout the building. The ground floor t is equipped with three extinguishers: one in the

electrical room, one in the mechanical room, and one in the center hall. Two extinguishers are located on the main floor; one fire extinguisher is placed at the back hall, and one is placed in the entrance foyer. One fire extinguisher is located in the film projector room on the second floor.

Appendix A: Relative Humidity and Temperature Readings




72.1%
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72.6°
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71.6°
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67.8°
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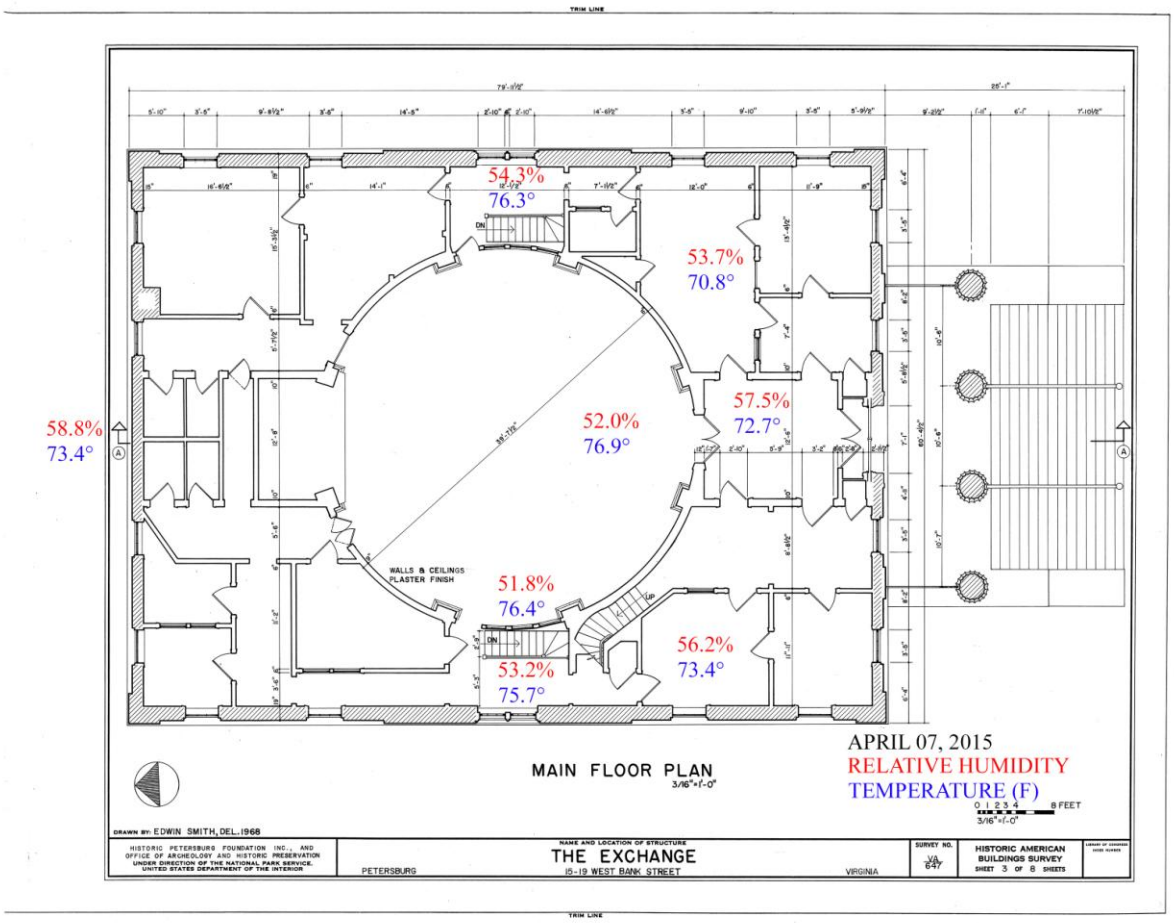
72.1°
54.7%
71.5°
63%
70.1°
61.2%
71.5°
GROUND FLOOR PLAN
3/16"=1'-0"
APRIL 07, 2015
RELATIVE HUMIDITY
TEMPERATURE (F)
0 1 2 3 4 8 FEET
3/16"=1'-0"
DRAWN BY: MICHAEL HAMITON, DEL. 1968
HISTORIC PETERSBURG FOUNDATION INC., AND OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION
UNDER DIRECTION OF THE NATIONAL PARK SERVICE, UNITED STATES DEPARTMENT OF THE INTERIOR
NAME AND LOCATION OF STRUCTURE
THE EXCHANGE
15-19 WEST BANK STREET
PETERSBURG
VIRGINIA
SURVEY NO.
VA
647
HISTORIC AMERICAN BUILDINGS SURVEY
SHEET 2 OF 8 SHEETS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WALLS & CEILINGS
PLASTER FINISH
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76.4°
56.2%
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53.2%
75.7°
MAIN FLOOR PLAN
3/16"=1'-0"
APRIL 07, 2015
RELATIVE HUMIDITY
TEMPERATURE (F)
0 1 2 3 4 8 FEET
3/16"=1'-0"
DRAWN BY: EDWIN SMITH, DEL. 1968
HISTORIC PETERSBURG FOUNDATION, INC., AND OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION UNDER DIRECTION OF THE NATIONAL PARK SERVICE, UNITED STATES DEPARTMENT OF THE INTERIOR
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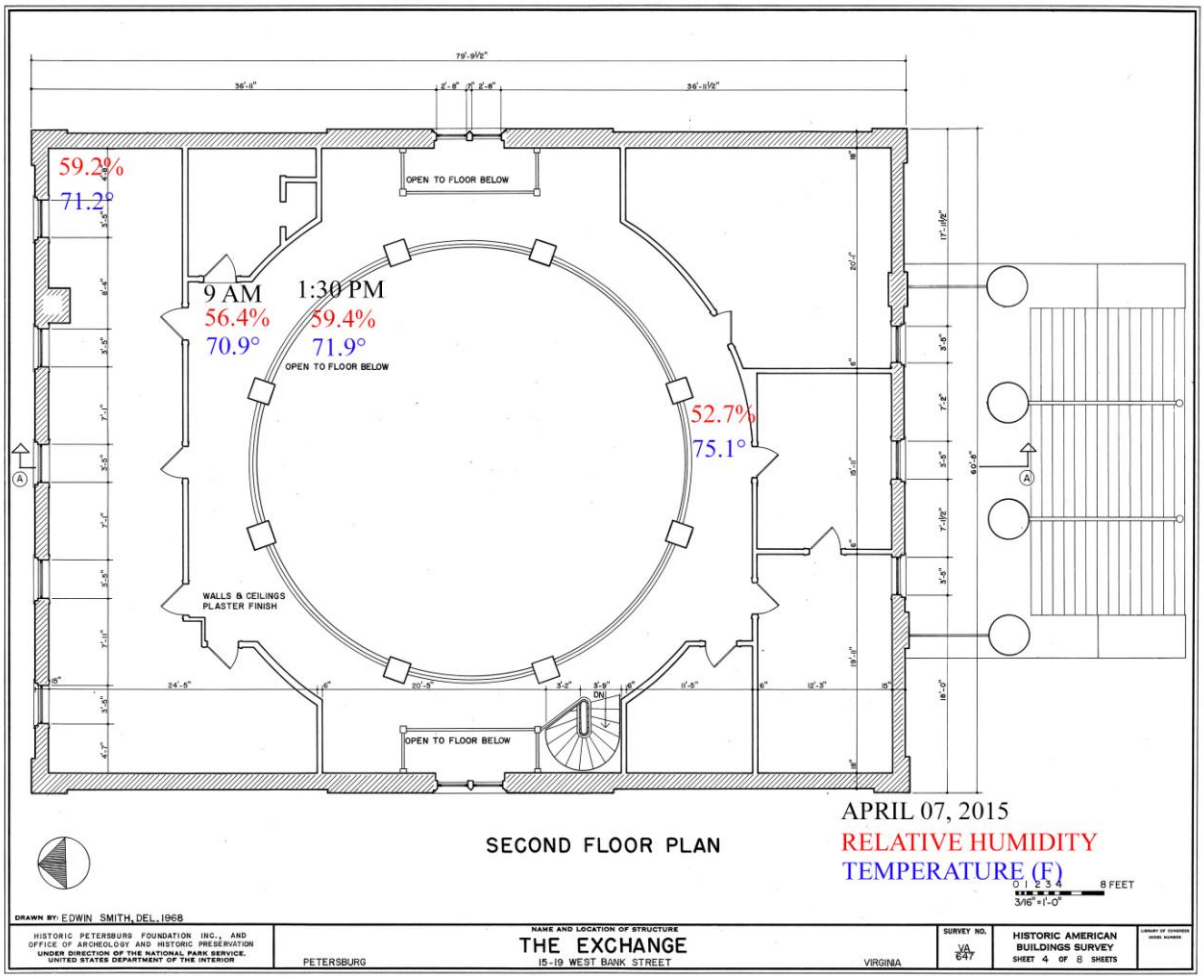
15-19 WEST BANK STREET
PETERSBURG
VIRGINIA
SURVEY NO.
VA-647
HISTORIC AMERICAN BUILDINGS SURVEY
SHEET 3 OF 8 SHEETS


59.2%
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70.9°
1:30 PM
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WALLS & CEILINGS
PLASTER FINISH
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APRIL 07, 2015
RELATIVE HUMIDITY
TEMPERATURE (F)
SECOND FLOOR PLAN
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DRAWN BY: EDWIN SMITH, DEL., 1968
HISTORIC PETERSBURG FOUNDATION INC., AND OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION
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HISTORIC AMERICAN BUILDINGS SURVEY
SHEET 4 OF 8 SHEETS

Part 2: Maintenance and Architectural Rehabilitation Guidelines

The project encompassing the building now known as the Siege Museum was envisioned as one to fully record the building in its current condition and to make recommendations based on observations on-site. The exterior and interior were fully recorded through photographic documentation, and the building was fully recorded through use of exterior and interior survey forms.

Overall, the building stands in relatively good condition. The quality and care of its initial construction has resulted in a building that has withstood years of hard use, additions, alterations, and modifications. Unfortunately, some of these modifications and instances of deferred maintenance have resulted in environmental conditions, in the form of extremely high levels of moisture, which are severely impacting the building.

The Siege Museum, located in the city of Petersburg, Virginia is listed on the Virginia Landmarks Register and the National Register of Historic Places. It is also a National Historic Landmark. Given this, it is important that any work undertaken on the building– be it maintenance, repair, or further rehabilitation and/or restoration, follow the Secretary of the Interior's Standards for Rehabilitation.

The Secretary of the Interior's Standards
The Secretary of the Interior's Standards (Department of Interior Regulations, 36 CFR 67) pertain to historic buildings of all materials, construction types, sizes, and occupancy and encompass the exterior and the interior, related landscape features and the building's site and environment as well as attached, adjacent, or related new construction. The Standards are to be applied to specific rehabilitation projects in a reasonable manner, taking into consideration economic and technical feasibility.

The Standards are:
1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.
2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.
6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by

documentary, physical, or pictorial evidence.
7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

Specific Architectural Recommendations

The recommendations in this section are divided into four categories:

- **Priority 1** indicates that the condition requires immediate attention because it is causing active deterioration and threatens the integrity of the structure, or that it poses a health and safety risk.

- **Priority 2** refers to a condition that should be addressed within a year, but only after the first priority needs have been met.

- **Priority 3** refers to a low priority issue that does not threaten the integrity of the historic building. Usually it pertains to an aesthetic problem which should be scheduled as time and budget permit.

- **Priority 4** refers to materials, features or systems that require routine inspection or show signs of early deterioration and may require action in the next ten years.

Site

Install sub-grade drainage system along the north elevation of the building in order to mediate the water infiltration into the ground level and basement. (*Priority 1)*

Connect new historically compatible downspouts to the subterranean drainage system; investigate a connection to the city's drainage system. *(Priority 1)*

Install new mortar to seal the gap between the base of the elevator tower and the surrounding asphalt and concrete surfaces. *(Priority 1)*

Patch and repair the cracked concrete and asphalt surfaces around the perimeter of the building. *(Priority 2)*

Investigate the installation of historically compatible cobblestone surfaces on the east and west drives, as well as in the parking area located to the north of the building. This will promote a more compatible and historic appearance. *(Priority 3)*

Investigate the original treatment of the site on the east and west sides of the portico. Provide a historically compatible landscape plan for the replacement of the modern planting areas and trees. (*Priority 3)*

Grade the site away from building perimeter for positive drainage. Slope of grade shall be a minimum of 4%. *(Priority 1)*

Implement a maintenance program to service/inspect the storm and sanitary lines for blockages with focus on the effect of seasonal debris. *(Priority 4)*

Take appropriate actions to protect on-site archaeological resources when making below-grade repairs. *(Priority 4)*

Install new signs in a compatible design for building identification. Install signs independent from building. Ensure that signs conform to City of Petersburg standards for building signage. *(Priority 4)*

Install general illumination site lighting. Utilize lighting mounted away from building and not on structure itself. *(Priority 4)*

Exterior

Prepare a comprehensive Historic Structure Report, prepared in accordance with The Secretary of Interior's Standards. *(Priority 1)*

Install an appropriate lightning protection system. *(Priority 3)*

Replace entire existing metal roof of the hip roof, dome, and the cupola, with a copper standing-seam metal roof with 12" valley between seams in each pan. (*Priority 1)*

Clean wood cornice and eaves of dirt and mold prior to installation of new gutters. *(Priority 1)*

Install new half-round copper gutters of 6" dimension and appropriate J-type hangers. Hang from fascia at 36" intervals. Provide historically appropriate round 4" copper downspouts. Have a plumbing engineer calculate the quantity required. Downspout discharge should be directed away from base of building. Tie into drainage system. *(Priority 1)*

Carefully install new copper flashing around chimneys, cupola, dome, the building itself, and all roof penetrations. Additional roof penetrations should be minimized during roof repair. *(Priority 1)*

Install metal ridge vents for attic ventilation. The roof sheathing should be cut away to vent the attic cavity into the metal roof vent assembly, which should be equipped with an integral insect-and-moisture screen. In addition, a thermostatically-controlled attic fan should be installed to appropriately ventilate the attic. *(Priority 1)*

Install snow guards along perimeter of roof. (*Priority 1)*

Provide new chimney cap at all chimney locations. (*Priority 1)*

Investigate the possibility of installing a more accessible roof hatch. (*Priority 1)*

Deteriorating stucco on the south portico columns should be removed and replaced with appropriate lime mortar stucco. (*Priority 3)*

Remove the Portland cement mortar in the joints of the stone floor of the south portico and replace with historically compatible hydraulic lime mortar. *(Priority 2)*

Remove and reset the sloped and canted granite steps at the south portico. While the steps are removed, repair structure beneath as required. Remove deteriorated mortar at the joints of the steps, and repoint the joints with a hydraulic lime mortar. *(Priority 2)*

Secure the anchors of the cast iron railings and posts at the south portico steps, remove the rust, and repaint. *(Priority 3)*

Remove the protective plywood panels at the cupola windows and restore the window sashes. Install new exterior storm windows to protect the historic sash and glass and to prevent water infiltration. Scrape and paint all wooden elements of the cupola. *(Priority 2)*

Restore all exterior window sashes. Use epoxy consolidants to repair deteriorated wood. Replace rotted wood in kind where necessary. Where wood is too deteriorated to repair, stiles and rails should be replaced. Remove deteriorated glazing and install new glazing at all windows. *(Priority 2)*

Check windows and hardware for operability, if operability is desired. Repair or replace sash cords and pulls as required. Provide new sash weights as necessary. *(Priority 2)*

Install a new bulkhead door on the north elevation to provide exterior access to the sub-basement. *(Priority 3)*

Install hardware to replace missing hardware at the exterior pocket doors of the south entrance. *(Priority 3)*

Investigate the removal of the modern elevator tower on the building's north side. Research the location and placement of the suggested north portico, and investigate the reconstruction of the portico with a new elevator for access. *(Priority 3)*

Replace the missing decorative element over the main portico doors. *(Priority 3)*

For continued use as a public facility, the Siege Museum should make all reasonable accommodations to be accessible to persons with disabilities in compliance with the Americans with Disabilities Act (ADA). *(Priority 3)*

Provide necessary ADA-compliant builder's hardware at accessible entry door. Provide ADA-compliant pathways into building with discrete signage labeling entries. *(Priority 3)*

Repaint the building's exterior with guidance provided by the Historic Paint and Finish Analysis. *(Priority 4)*

Interior

Conduct a Historic Paint and Finish Analysis to investigate the original treatments of the interior and exterior of the building. *(Priority 4)*

Design and install a new HVAC system. *(Priority 1)*

Eliminate the existing supply diffusers in the dome and patch and repair the plaster. *(Priority 1)*

Install new minimal diffusers in an unobtrusive area to condition the rotunda. *(Priority 1)*

Design and install a new building-wide sprinkler system. The system shall be minimally intrusive to existing historic finishes and spaces. *(Priority 2)*

Install / upgrade the security system. Provide sensors at all exterior doors and windows, and motion sensors on the interior. Conform to City of Petersburg standards for security. The system shall be minimally intrusive to existing historic finishes and spaces. *(Priority 4)*

Install a new, updated data and communication system in areas to be used

for seminars, meetings and offices. *(Priority 4)*

Install interior storm panels with UV protective filters at all exterior windows. The storm windows should be removable or include sliding panels so that sashes can be opened. (*Priority 3*)

If interior storms not installed, apply UV film to glazing, especially in exhibit areas. Consider solar shading options such as MechoShade Systems or period window coverings to protect interiors from excessive UV damage. *(Priority 3)*

Repair the deteriorated arch and wood joist at the north end of the sub-basement. (*Priority 2)*

Repair and repoint the masonry arches in the basement with appropriate lime-based mortar to match original. Test mortar to determine proper composition, strength, color, and texture. See masonry repair procedures above. *(Priority 2)*

Remove the remnants of the electric lines and conduit in the sub-basement. (*Priority 2)*

Install vapor barrier in sub-basement. Investigate the possibility of installing a sump pump. (*Priority 2)*

Investigate the slope in the gallery floor. (*Priority 2)*

Install a subsidiary guardrail behind the existing gallery railing to provide the termite control than ground poisoning, there are safer "non-repellant" liquids that proper railing height. The railing will be minimal in design and will be placed back from the original railing to remain invisible from the first floor. *(Priority 3)*

Remove the dropped ceilings in the public spaces and offices and restore the original plaster ceilings. *(Priority 3)*

Patch and repair the water damaged plaster at the second floor gallery ceiling. (*Priority 3*)

Patch and repair the water damaged plaster walls at the second floor gallery. Check for loose plaster and cut out patches with plaster that has lost its key. Prime and patch as required per the plaster repair recommendations. (*Priority 3*)

Investigate the ceiling crack at the first floor's southwest room. (*Priority 3*)

Install a new attic hatch and stair to facilitate access to the attic space. (*Priority 1)*

Replace missing and damaged portions of ornament around the interior of the dome (at the curving entablature that is carried by the rotunda columns). (*Priority 3*)

Secure loose and shifted wood panels at the rotunda column capitals. *(Priority 3)*

Remove the modern carpet from all main floor and second floor spaces. (*Priority 3*)

Begin a regular program to eliminate the danger of termite infestation. Recognizing that some would prefer less toxic means of are less toxic than the older repellent types, and this option is worthy of investigation.

In addition, inspect the attic quarterly for hornet nests and monthly, during warm months, survey the exterior for mud dauber nests and wasp nests. *(Priority 4)*

Investigate the possibility of restoring the building's interior to reflect its original state, both in decoration and layout. (*Priority 4*)

Restore the main entrance doors at the top of the south portico steps. (*Priority 3*)

Avoid refinishing floors in historic areas. Clean, lightly sand only as necessary, and oil floorboards instead. *(Priority 4)*

Repaint the interior of rotunda and surrounding spaces as indicated in the Historic Paint and Finish Analysis. (*Priority 4*)

Prioritized Recommendations

Priority 1 indicates that the condition requires immediate attention because it is causing active deterioration and threatens the integrity of the structure, or that poses a health and safety risk.

Priority 2 refers to a condition that should be addressed within a year, but only after the first priority needs have been met.

Priority 3 refers to a low priority issue that does not threaten the integrity of the historic building. Usually it pertains to an aesthetic problem which should be scheduled as time and budget permit.

Priority 4 refers to materials, features or systems that require routine inspection or show signs of early deterioration and may require action in the next ten years.

Architectural Recommendations, Organized by Priority	**Priority (1, 2, 3, or 4)**
Site	
Install a trench drain along the building's north elevation to prevent rainwater from traveling down the slope of the parking lot and entering the building's basement and sub-basement.	1
Connect downspouts to the subterranean drainage system; investigate a connection to the city's drainage system.	1
Install new mortar to seal the gap between the base of the elevator tower and the surrounding asphalt and concrete surfaces.	1
Grade the site away from building perimeter for positive drainage. Slope of grade shall be a minimum of 4%.	1
Patch and repair the cracked concrete and asphalt surfaces around the perimeter of the building.	2
Investigate installing cobblestone surfaces on the east and west drives, and on the north parking area for a more compatible and historic appearance.	3
Investigate the original treatment of the areas on the east and west sides of the portico to provide a replacement for the modern planting areas and trees.	3
Implement a maintenance program to service/inspect the storm and sanitary lines for blockages with focus on the effect of seasonal debris.	4

Architectural Recommendations, Organized by Priority	Priority (1, 2, 3, or 4)
Take appropriate actions to protect on-site archaeological resources when making below-grade repairs.	4
Install new signs in a compatible design for building identification. Install signs independent from building. Ensure that signs conform to City of Petersburg standards for building signage.	4
Install general illumination site lighting. Utilize lighting mounted away from building and not on structure itself.	4
Exterior	
Prepare a comprehensive Historic Structure Report, prepared in accordance with The Secretary of the Interior's Standards.	1
Install a new standing seam copper roof on the hip roof of the building, the dome, and the cupola.	1
Install new copper gutters and new copper downspouts. Install the appropriate size and number of downspouts around the perimeter of the building.	1
Clean wood cornice and eaves of dirt and mold prior to installation of new gutters.	1
Carefully install new copper flashing around chimneys, cupola, dome, the building itself, and all roof penetrations.	1
Install snow guards along perimeter of roof.	1
Install metal ridge vents for attic ventilation.	1
Provide new chimney cap at all chimney locations.	1
Investigate the possibility of installing a more accessible roof hatch.	1
Remove the Portland cement mortar in the joints of the stone floor of the south portico and replace with hydraulic lime mortar.	2
Remove and reset the sloped and canted granite steps at the south portico. Remove deteriorated mortar at the joints of the steps, and repoint the joints with a hydraulic lime mortar. Replace the rotted beams and joists that are	2

Architectural Recommendations, Organized by Priority	Priority (1, 2, 3, or 4)
supporting the portico floor.	
Remove the protective plywood panels at the cupola windows and restore the window sashes. Install new exterior storm windows to protect the historic sash and glass and to prevent water infiltration.	2
Restore all exterior window sashes. Use epoxy consolidants to repair deteriorated wood. Where wood is too deteriorated to repair, stiles and rails should be replaced. Remove deteriorated glazing and install new glazing at all windows.	2
Check windows and hardware for operability, if operability is desired. Repair or replace sash cords and pulls as required. Provide new sash weights as necessary.	2
Deteriorating stucco on the south portico columns should be removed and replaced with appropriate lime mortar stucco.	3
Secure the anchors of the cast iron railings and posts at the south portico steps, remove the rust, and repaint.	3
Install a new bulkhead door on the north elevation to provide exterior access to the sub-basement.	3
Install an appropriate lightning protection system.	3
Install hardware to replace missing hardware at the exterior pocket doors of the south entrance.	3
Investigate the removal of the modern elevator tower on the building's north side. Research the location and placement of the suggested north portico, and investigate the reconstruction of the portico with a new elevator for access.	3
Replace the missing decorative element over the main portico doors.	3
For continued use as a public facility, the Siege Museum should make all reasonable accommodations to be accessible to persons with disabilities in compliance with the Americans with Disabilities Act (ADA).	3
Provide necessary ADA-compliant builder's hardware at accessible entry door. Provide ADA-compliant pathways into building with	3

Architectural Recommendations, Organized by Priority	Priority (1, 2, 3, or 4)
discrete signage labeling entries.	
Repaint the building's exterior with guidance provided by the Historic Paint and Finish Analysis.	4
Interior	
Design and install a new HVAC system. A four-pipe system or vertical air handlers is recommended. The four-pipe system is designed to have humidifiers and dehumidifiers in the system.	1
Eliminate the existing supply diffusers in the dome and patch and repair the plaster. Install new minimal diffusers in an unobtrusive area to condition the rotunda.	1
Install a new attic hatch and stair to facilitate access to the attic space.	1
Design and install a new building-wide sprinkler system.	2
Repair the deteriorated arch and wood joist at the north end of the sub-basement.	2
Repair and repoint the masonry arches in the basement with appropriate lime-based mortar to match original.	2
Investigate the slope in the gallery floor.	2
Remove the remnants of the electric lines and conduit in the basement.	3
Install interior storm panels with UV protective filters at all exterior windows.	3
Install a subsidiary guardrail behind the existing gallery railing to provide the proper railing height. The railing will be minimal in design and will be placed back from the original railing to remain invisible from the main floor.	3
If interior storms not installed, apply UV film to glazing, especially in exhibit areas.	3
Remove the dropped ceilings in the public spaces and offices and restore the original plaster ceilings.	3
Patch and repair the water damaged plaster at the second floor gallery	3

Architectural Recommendations, Organized by Priority	Priority (1, 2, 3, or 4)
ceiling.	
Patch and repair the water damaged plaster walls at the second floor gallery.	3
Investigate the ceiling crack at the main floor's southwest room.	3
Replace missing and damaged portions of ornament around the interior of the dome (at the curving entablature that is carried by the rotunda columns).	3
Secure loose and shifted wood panels at the rotunda column capitals.	3
Remove the modern carpet from all main floor and second floor spaces.	3
Restore the main entrance doors at the top of the south portico steps.	3
Investigate the possibility of restoring the building's interior to reflect its original state, both in decoration and layout.	4
Repaint the interior of rotunda and surrounding spaces as indicated in the Historic Paint and Finish Analysis.	4
Conduct a Historic Paint and Finish Analysis to investigate the original treatments of the interior and exterior of the building.	4
Install / upgrade the security system. Provide sensors at all exterior doors and windows, and motion sensors on the interior.	4
Install a new, updated data and communication system in areas to be used for seminars, meetings and offices.	4
Begin a regular program to eliminate the danger of termites, powder post beetles, dirt daubers, and other pest infestation.	4

Structural Assessment

Cupola

Although the cupola structural framing is concealed by interior and exterior finish materials, limited observations were possible. A portion of roof framing near the eave was visible where a piece of fascia board was removed. Severe deterioration of one roof joist was observed at that location. Additional hidden deterioration of roof framing elements is likely. A single piece of exterior siding was removed to allow observation of wall framing at the base of the cupola. The wood is discolored, but decay was not evident in the components that were visible. It is suspected that there is some decay and deterioration hidden from view at this level.

Exterior wood trim and fascia is severely deteriorated (Photo 1)

The protective plywood was removed from one of the cupola windows to allow observation of the existing window. Refer to **Architectural Evaluation.**

Cupola metal roofing and flashing at the base of wall-to-dome roof were observed. Refer to **Roofing Evaluation**.

Roof Framing

The timber roof structure includes main roof framing and domed roof framing. The domed roof is supported on two main trusses spanning east-west from exterior wall to exterior wall and two secondary trusses spanning north-south between the main trusses. The trusses are located at the edges of the base of the dome, providing support for the dome framing and the surrounding main roof framing. Four 3x6 edge beams, spanning diagonally at the inside corner where the trusses intersect, provide support for the remainder of the dome base. The dome framing consists of beams laid out in a radial pattern around the dome, supported on a 2x12 timber ring beam at the base of the dome and a timber compression ring at the base of the cupola (top of the dome).

Two additional trusses spanning east-west are located at the ends of the gable shaped roof at front and rear. These trusses closely match the main trusses. They support the hipped ends of the roof structure and a portion of gable roof framing spanning back to the main “dome support” trusses.

The north-south truss on the west side has developed a split in the bottom chord near its connection to the main truss at the south end (Photo 2). The east-west main truss on the south side has developed a split near its east end. The diagonal beams at the truss intersections have experienced significant deflection. Shear splits have developed in the 3x6 beams at the bearing locations. Some of this appears to be the result of decay caused by past water infiltration, but these beams also appear to be generally undersized for the loading that they could possibly be subjected to.

The upper half of the radial roof beams at the dome cannot be observed without removal of ceiling finishes or removal of roofing and roof sheathing from above (Photo 3). The lower half of the radial framing is in fair condition. An area of decay was observed near the lower end of one of the radial beams (Photo 4). The timber ring beam is damaged and has deflected badly in at least one area (Photo 5). The damage appears to be the result of decay caused by past water

infiltration, but is also caused by insufficient support of the ring beam. At various locations around the dome base the ring beam is supported on timber brackets fastened to the trusses. A number of these brackets have failed and are no longer providing adequate support (Photo 6).

The corners of the hipped roof at the front and rear of the building are framed with hip beams supported on the second (outer) set of east-west trusses and the exterior walls. The hip beam at the SE corner has experienced decay due to water infiltration.
(Photo 7)

Roof sheathing is damaged or missing in limited areas at various locations (Photo 8).

Damage to the plaster ceiling above the balcony currently exists in several locations. Numerous patches of earlier plaster damage are also visible (Photo 9). The current and previous damage appears to be the result of water infiltration, or in some cases condensation and humidity. However, the water infiltration does appear to have slowed down in most areas. The wood framing does not exhibit the amount of decay and damage that was expected at the locations of severe plaster deterioration. These observations were made from within the attic, without removing plaster from below. More damage may be hidden by the plaster finish, but it was not readily apparent from our vantage point in the attic during this survey.

The plaster ceiling bulkhead above the second floor balcony has deflected on the east and west sides of the building (Photo 10). The deflection is related to the column movement discussed further in a following section addressing Main Floor Framing.

Wood hangars supporting the plaster ceiling above the upper floor level and balcony have pulled away at their nailed connections in some locations. No significant movement of the ceiling as a result of this condition was observed during our survey.

Second Floor Framing

The floor framing at the south-east quadrant of the building has deflected significantly. Several failed joist connections were also observed. Access openings already cut in the flooring and in the ceiling below allowed observation of a limited amount of floor framing (Photo 11). One clue to the floor deflection is the framing layout, which leads us to believe that an original opening in the floor was in-filled, causing an overload condition in the original framing.

The balcony floor has deflected significantly along the east and west sides of the building. This movement is the result of deflection of the main floor framing below, which originally supported the two main columns on the east and west sides of the building. This condition is discussed further in the following section addressing Main Floor Framing.

Moisture damage was observed in the floor framing at a janitors closet and restroom at the north end of the second floor. This damage is visible from below (Photo 12). Condensate was observed on ductwork behind the wall hatch in one of the rooms at this level.

Main Floor Framing

Floor framing has deflected significantly in the south-east and south-west quadrants at this level. The original joist sizes are insufficient for the span length. Normal floor loading combined with the dead weight of the circular stud wall below the second floor balcony have contributed to

the excessive deflection. A number of joists on the west side of the building have been notched and damaged during utility installation (Photo 13). Several cases of insufficient bearing length were also observed.

Steel columns have been added from this level down, below the two original timber columns located on the east side of the building and the two original columns located on the west side of the building (Photo 14, 15). It is our opinion that the timber columns originally stopped at this level and were supported on the main floor framing. The roof trusses may have originally been intended to carry all the roof load, with the columns intended to support second floor load only. Deflection of the roof trusses likely resulted in the roof load being transferred to the columns and into the main floor framing, causing the floor framing to deflect. The main floor framing on the east and west sides deflected under the column loads, causing the second floor and the plaster ceiling and bulkhead above the balcony to also drop. The two original columns at the north end of the building and the two at the south end of the building did not deflect downward because they are located directly above the brick bearing walls that extend from this level down to the foundation. This differential deflection is easily detected when walking on the main floor and second floor, and is visible in the bulkhead above the second floor balcony (Photo 13).

We attribute the sag in the main floor and second floor to the deflection of the main floor joists prior to the installation of the steel columns below the original columns on the east and west sides. We do not attribute it to foundation settlement.

A large steel safe is located on the floor in the room at the south-east corner of the building. This is likely creating an over-load condition for the supporting joists.

Ground Floor Framing

The floor framing in the north-east and north-west quadrants of the building has been replaced with concrete slab-and-beam construction. The slab and beams are generally deteriorated, with many areas of severe deterioration with exposed and corroded reinforcing steel (Photo 16).

Steel beams supporting the slab below the stairwell at the north-east corner are severely corroded. A concrete housekeeping pad has been placed on the slab in the mechanical room adjacent to the stairs, likely creating an over-load condition.

A concrete slab has been placed on the wood framing at the center portion of the north end of the building, between the slab-and-beam floors. Much of the wood framing below the slab has experienced decay due to moisture exposure.

The original floor construction is exposed and easily observed from the basement level. The floor joists span the east-west direction, and are supported on the exterior stone foundation walls, two rows of timber beams at about 11 feet from each exterior wall, and two arched brick foundation walls at about 21 feet from each exterior wall. The joists originally rested on a timber sill built into the bearing walls. Much of this sill is still in fair to good condition, but in many locations the sills have rotted and were replaced with slate shims or pieces of brick (Photo 17). In some cases the joists have settled to the top of the wall where the sills have rotted away and were not replaced. A number of joists are decayed at the ends bearing on the exterior walls.

The two rows of timber beams are supported on brick piers. It is our opinion that these beams and piers are not original, but were installed later to address deflection of the floor joists in these

areas. The original joist span from exterior wall to brick foundation wall (>20 feet) was excessive for the size and spacing of the joists. Examination of the timber beams and the brick and mortar in the piers leads us to believe that these materials were produced and installed during a later period than the original construction.

We attribute the sag in the ground floor to the deflection of the floor joists prior to the installation of the two lines of timber beams and brick piers. This permanent deflection was locked in when the beams were installed.

The timber beams along the west side appear to have been heavily loaded, possibly due to storage rooms directly above. Several of these multi-ply beams have experienced compression failure, indicated by crushing and bulging, at their bearing point on the masonry piers. A number of bricks directly below the beams at their bearing points have spalled faces (Photo 18). The beams along the east side have experienced the same type of failure, but to a lesser degree.

A number of floor joists have been notched and damaged during installation of utilities. Others have experienced crushing failure at the bearing points as a result of rot or inadequate bearing length.

Termite damage was observed in several joists, although there does not appear to be any active infestation (Photo 19).

Foundations

The deflection of the ground floor, main floor, and second floor, on the east and west sides, gives the impression that foundation settlement of the steel columns and the brick piers has taken place. We believe these deflections occurred earlier, for the reasons described above, and were “locked in” with the installation of those added support systems. We observed no other indications of foundation settlement, and the geotechnical investigation that was performed by Zannino Engineering, Inc. in January 2013 does not indicate to us that foundation settlement was likely. We cannot say definitively that no settlement has taken place or contributed to the floor deflections, but if so we feel that it would have been a minor contributor.

Portico

The overhead concrete slab in the basement below the Portico is severely deteriorated. The slab is cracked and spalled in several locations and has deflected noticeably. The timber beams supporting the slab are severely decayed due to moisture exposure. One timber beam has fallen and another appears to have little or no load carrying capacity. The shoring was installed in February at the direction of Moseley Architects after the condition was noticed during an initial walk-thru of the building. The shoring is still in place. Settlement of the upper portico slab at the front entrance is visible and may be attributable to the failure of the basement overhead slab.

Summary of Structural Repairs/Rehabilitation

All of the structural deficiencies noted in this report have an effect on the structural integrity of the building. We recommend that all of these issues be addressed and repairs be designed and implemented in a timely manner. Below is a general listing of areas addressed in the previous sections requiring structural repairs/rehabilitation.

- Cupola roof and wall framing repairs
- Investigate upper dome roof framing below cupola and repair as required
- Lower dome roof framing repairs
- Main roof framing repairs
- Roof truss repairs
- Roof sheathing repairs
- Plaster ceiling support framing and hanger repairs
- Bulkhead framing repairs
- Second floor framing repairs
- Main floor framing repairs
- Ground floor framing repairs
- Ground floor concrete slab and beam repairs
- Basement brick pier, brick foundation wall, and stone foundation wall repairs
- Basement floor slab repairs at mechanical well
- Portico slab repairs at ground floor room below portico

Recommendations for repairs and rehabilitation not directly effecting structural integrity are addressed in the **Architectural Evaluation** and the **Roofing Evaluation.**

End of Structural Evaluation

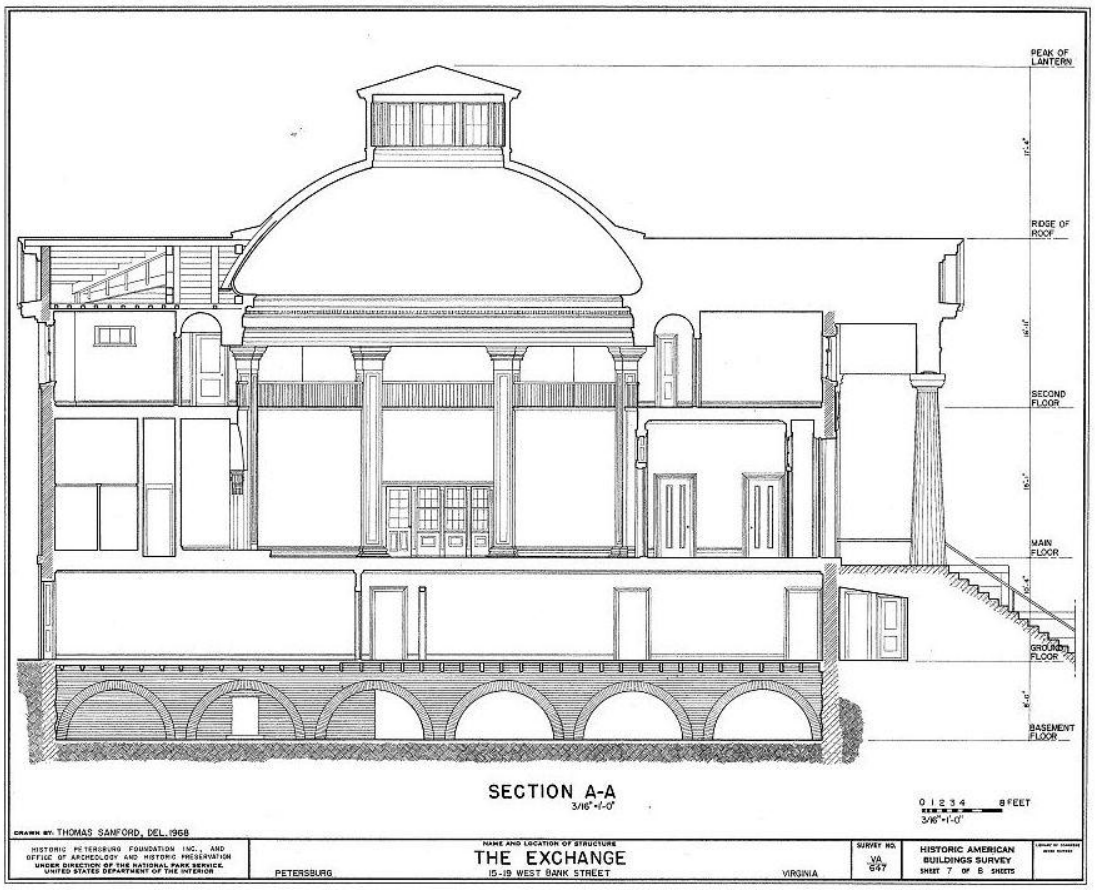

Figure 1

Photo 1

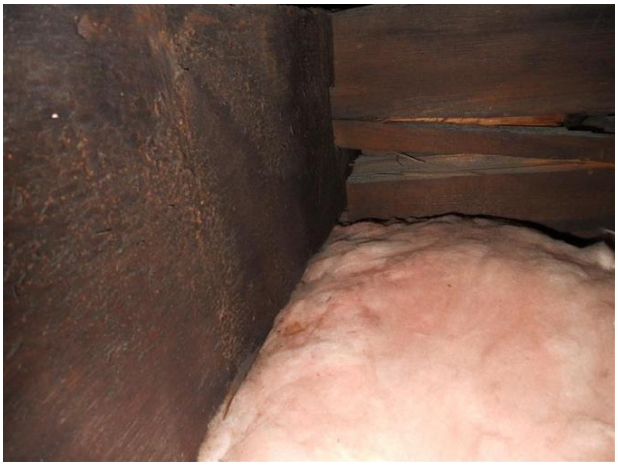

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

Photo 10

Photo 11

Photo 12

Photo 13

Photo 14

Photo 15

Photo 16

Photo 17

Photo 18

Photo 19

Photo No.1
General overview of roof area showing the various roof configurations. Photo taken from the HABS 1968 survey data. Areas identified include:

- The front portico with a gable shaped roof area with standing seam metal roof panels sloping to exterior half round gutters. Also noted metal clad water table area at base of front gable. Similar gable area also found at rear of the main roof area.
- The main body of the roof area consists of a hip shaped sloped roof again covered with standing seam metal roofing and draining to exterior gutters. This roof area transitions into the dome structure at the center of the building.
- The dome structure extends vertically from the main roof area and is clad with metal wall panels at the vertical sections and tapered sloped metal panels at the curved roof area.
- The cupola or lantern area contains multiple windows and associated wood trim and is covered with sloped, flat seam, painted metal roof panels.

Photo No. 2
General overview of top of dome and cupola area. Tapered, standing seam metal roof panels noted.

Roof Assessment

The existing roof sections of the Seige Museum were visually surveyed and the existing conditions observed. The existing metal roofing systems and related accessories were evaluated as to serviceable condition and remaining service life. Overall, the surveyed areas were noted to be in fair to poor condition and the overall roof is recommended for roof system replacement in the near future.

These sloped metal roof areas encompass the entire facility and are currently covered with standing seam metal roofing with a painted finish. The sections, as referenced, include the front portico sloped roof, the main sloped roof area, the dome area and the cupola or lantern roof area, all covered with the metal roofing and constructed at various levels or elevations. Also, there is a newer addition to the rear of the facility which houses the elevator which is also covered with painted metal roofing. In general, the metal roofing appears well into its anticipated service life and is in need of repair and / or replacement.

Specific sections of these referenced areas were observed with maintenance type repairs in an effort to maximize the life expectancy of the current roofing system in place. At this date, it appears that the various roofing sections have limited service life remaining and are near the end of their anticipated life cycle. Decisions will be necessary for planning, scheduling, budgeting, etc. to initiate a roof replacement project as proposed in the very near future.

As part of our field investigation for the referenced facility this “Visual Roof Survey” (VRS) was performed in order to evaluate the existing conditions, gather data related to the building structure, roof top equipment and activities, roof drainage, etc. All information gathered will hopefully assist with decisions necessary for the overall roofing program for this building.

Photo No. 3
General overview of the main roof and dome area. Photo taken at rear section.

Photo No. 4
General overview of the main area and front portico roof. Valley area shown.

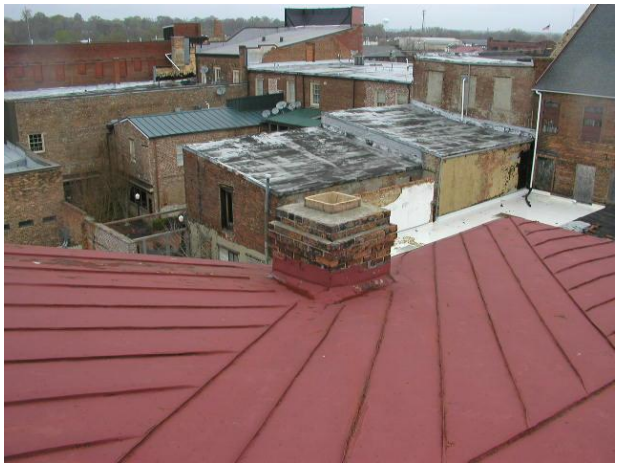

Photo No. 5
General overview on main roof at the rear section. Chimney noted positioned in the valley area.

General Roof Assembly Information:

- The field investigation and review of the existing roofing conditions was performed on 01/09/15 and 04/07/15. Facility personnel provided access to the referenced roof areas. Team members reviewed the overall metal roof weatherproofing, drainage provisions, flashings and sheet metal components as well as other related exterior issues.

- An initial review of roof plan layout, inquiries as to previous repairs, etc. was conducted with facility personnel in an effort to gather knowledge of the history of the existing roof and building components. The roof decking and structure were identified as wood.

- The existing roofing was observed as a sloped, standing seam, metal roof assembly. The panel materials are believed to be the old style tin coated steel with a painted finish. Several indications of “Follansbee” (metal panel manufacturer) metal panel materials was observed stamped on the metal roof and wall products. The roofing sections are typically divided by formed standing seams at the ridge, hips and valley areas.

- The dome panels were identified as tapered, standing seam panels curved to follow the profile of the dome structure. The cap or roof for the cupola was identified as flat seam metal panels divided into pie shaped sections with standing seams.

- As observed, there are significant areas on the roofing where the paint finish is in poor condition. The paint has deteriorated, the tin coating is gone and rust is showing through. These metal roof components are showing the typical signs of aging roofing of this type and is well into its anticipated life cycle.

- The elevator roof section is the newest of the areas surveyed. This sloped metal roofing is similar in style and color and appears in fair condition. There is some age on the system and some repair work was noted.

- These roof sections are typically drained with perimeter gutters. Some repair work was observed. Four downspout locations were noted. Two at the east elevation go into a below grade storm system and the two at the west elevation discharge at grade.

Summary of Findings:

As observed the roof was found to be well into its anticipated life expectancy. The overall metal assembly appeared fairly tight, however there were some open areas or splits in the seaming of the metal panels. One of the biggest factors noted is the deterioration of the paint finish and the rust to the metal panels.

Also noted were some awkward seaming and slope direction of the standing seam roof panels. Damming conditions were noted at specific areas.

As observed, there is limited ventilation for the attic space. This requirement will need to be explored.

There is also significant deterioration to the wood trim members related to the cupola or lantern structure. Paint finishes are very thin and deteriorated wood components are noted. Open joints were observed. Previous repair efforts were also noted to the window sill areas. The wood trim areas are not considered 100% weathertight at this date.

See the following pages for photos and descriptive data for the individual areas.

Photo No. 6
Observation –water table area at rear gable. Deteriorated wood trim members noted. Metal cover to be replaced as part of the new roof assembly. Recommend all deteriorated wood trim members to be repaired or replaced and new paint finishes applied.

Typically, with a roof replacement project of this caliber and type, all wood trim, cornice, fascia, soffit, etc. shall be repaired and new paint applied. New paint recommended extending to the brick line below the soffit area at a minimum.

Photo No. 7
Observation of deteriorated conditions at gable trim members. Repairs required. Also modifications to the gutter system noted.

Photo No. 8
General overview of area as discussed in photos no. 6 & 7. As part of the roof renovation, recommend new paint and wood repair down to the brick line as a minimum.

Photo No. 9
General observation of underside of roof deck. Typically dry. Water stains noted on wood components. Reference the structural section of this report for further discussion.

Photo No. 10
General overview of dome structure. Light gauge flat, metal panels observed at vertical section. Standing seam panels observed at dome section with two different slopes noted. Continuous panel lengths conform to the dome shape and are bent to form a drip edge.

Photo No. 11
Observation of flat wall panels (sheets). Typically nailed into place. Evidence of rust staining also present.

Photo No. 12
Observation - panel runs are fabricated from various lengths of the sheet material and have numerous lap seams. Note the width of the panels. Pans start out at a minimal width at the base and taper to a fairly narrow width at the top of the run.

Photo No. 13
Observation – light gauge panel material noted. Painted and unpainted surfaces noted.

Photo No. 14
Observation of split in metal materials at ridge seam. Solder repair attempt noted.

Photo No. 15
Observation of cupola or lantern. Deteriorated wood conditions noted at cornice area and at base. Flat seam panels noted at roof area.

Photo No. 16
General observation of wood and paint finishes.

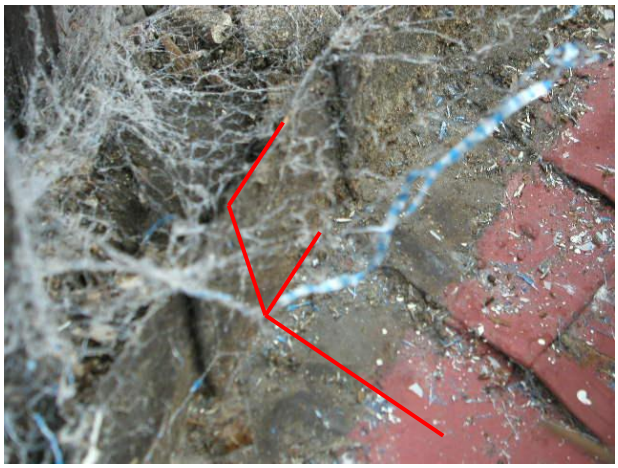

Photo No. 17
Observation – bottom trim board of copula removed to reveal substrate conditions and turned up ends of the standing seam dome roof panels.

Photo No. 18
Observation – severe wood deterioration at cornice trim.

Photo No. 19
Observation at perimeter conditions of main roof area. Transition in roof slope noted. Structural framing below indicates possible built-in gutters at one time. Current gutter conditions shown.

Photo no. 20
Observation – transition in perimeter deck slope.

Photo No. 21
Overview of roof slope transitions; slope from ridge to eave, hip detail and valley detail. Panels as installed do not necessarily run parallel to the roof slope. Configurations exist where damming conditions are created and water is forced to run across the standing seams.

Photo No. 22
Observation – valley area shown. Note position of panels adjacent to the valley.

Photo No. 23
Observation – typical conditions for the paint finish.

Photo No. 24
Again deteriorated paint finish. The red finish first goes and exposes the tin finish. The tin coating then wears to expose the steel material and rust begins to form.

Photo No. 25
General overview of chimney. Located in valley area. Some repairs noted.

Photo No. 26
Observation – roof access hatch. Deteriorated finishes noted.

Photo No. 27
General overview of elevator roof area. Similar standing seam panels noted. Also metal coping covers. Deterioration noted on paint finishes. A Retro-fit ridge cover has been added.

Photo No. 28
Observation – deteriorated conditions noted on stucco finishes. Specific damages noted below window sill area.

Photo No. 29
Observation – rust stains noted on stucco wall finish.

Photo No. 30
Observation – small roof area at rear entrance. Deteriorated finishes noted on the metal components.

Photo No. 31
Observation – exterior mounted, half round gutter system. Downspout locations - front and rear corners.

Photo No. 32
Observation – exterior mounted, half round gutter system. Downspout locations - front and rear corners.

Photo No. 33
Observation – front corner downspout routed to below grade storm sewer.

Photo No. 35
Observation – rear corner, west side - downspout routed to cast drain pipe and discharge at grade.

Photo No. 34
Observation – rear corner, east side - downspout routed to cast drain pipe and to below grade storm sewer.

Recommendations:

The existing metal roofing, covering the various sections of the Seige Museum, is near the end of its remaining service life. The existing metal materials have significant rust and are very thin at this date. Some defective details were also noted. The wood at the cupola is not considered weathertight and adding to the concerns for the overall weather tightness of the facility. Ventilation for the attic space and interior conditions may also be contributing to the interior moisture problems. The ageing roofing along with interior HVAC concerns needs to be addressed to prevent further interior damage. It is recommended that the roof needs to be scheduled for replacement along with other improvements as soon as the facility program will allow. The replacement recommendations are as follows:

It is recommended that the old tin roofing and any underlayment be removed down to the wood deck level. Wood decking can be inspected and repairs made if required. Attachment of the existing wood decking should also be reviewed. New underlayment shall be installed with a new standing seam metal roof system conforming to the shapes of the hipped roof, dome and cupola. At this point in the proposed project, copper

roofing is considered as a long term replacement choice. The material works well with the building configurations, works well with the various details and meets the requirements for the restoration of historic structures.

It is recommended to proceed with the replacement design and / or other improvements as proposed. As referenced, with the new work, the copper materials are recommended as a quality replacement roof system and will offer long term performance. It is recommended that enhancements be made to the attic ventilation and improve the drainage provisions. It is recommended to not proceed until all required items can be properly addressed. The design and replacement work shall comply with the requirements of the owner and / or tenant for the roof replacement project.

Proposed Roof Replacement System

The proposed roof replacement would upgrade the total roof assembly, repair and improve the cupola conditions, address drainage provisions, address ventilation provisions and other improvements that may be necessary at that time. The proposed copper roofing should provide a 75 – 100 yr. plus roof system. Specific type and scope can be fine-tuned as the project develops. Replacement roofing scope would possibly include the following:

1. Complete roof removal of all existing roofing materials down to the structural deck level. Metal, felts, etc.
2. Inspection of the existing decking and make any necessary repairs. Re-nailing of the individual deck boards may be required.
3. Provide underlayment for the entire roof area. Enhance underlayment at eave, hip, valley and ridge areas. Provide “Ice and Water Shield” type material at these locations. Other penetrations shall also be addressed with the enhanced material.
4. Install the copper standing seam metal roof system as indicated, to conform to the existing roof configurations. Portico and hip roof areas to start with drip edge / cleat, continuous panel runs as practical and concealed clips as required. In seam sealant applied. All standing seams and hip and ridge details to be seamed with a full 360 degree turn. Detail and transition points can be soldered for a watertight condition. Finished roofing profiles to be similar to the existing roof configurations.
5. The dome to have a similar standing seam roof system. Vertical sections to have wall panels with concealed clips, base flashings, top drip / fascia flashings, etc. The dome roof panels shall be custom formed tapered panels conforming to the existing dome shape with the finished appearance similar to the existing. All seams sealed and turned as referenced above.
6. The cupola trim wood shall be repaired or replaced. Sealant and paint finishes applied. Cladding of the wood with pre-painted materials may be an option. Will need to coordinate with restoration requirements.
7. Cupola roof area to be clad with flat seam copper panels, all seams soldered continuous and with standing seams at roof divisions.
8. Water table areas to be re-clad with the copper standing seam panels.
9. Elevator and entrance roof area to have similar standing seam copper roofing.
10. Provide new copings (elevator roof area), fascia, counter flashings or other trim as required for a complete system throughout.
11. Attic ventilation needs to be explored. Roof ventilators, soffit ventilation, etc. may be required.
12. Wood repair recommended at all eave areas. Replacement of deteriorated wood shapes; fascia board, cornice trim, soffit board, etc. New paint finishes to be applied. Recommend paint to entire eave and gable areas down to the brick line as a minimum.
13. Replace existing gutter system. Current exterior mounted, half round gutter system to be replaced. Complete system upgrade to include expansion provisions, hangers / brackets, drop tubes, downspouts, etc. System to comply with restoration requirements.

Proposed Repair and / or Replacement Costs:

	1 to 2 years	5 years	10 years	15 years	20 years
Roof Replacement Copper Standing Seam Portico, Main Roof, Cupola and Elevator Roof Areas.	Complete Replacement - estimate: $25.00 to $30.00 / sf* Includes demo of existing. Estimate: 7,000 sf @ $30.00 / sf = $210,000.00 Exact sq. ft. not known at this date. To be verified.	General Maint. $2,500.00	General Maint. $5,000.00	General Maint. $5,000.00	Repeat Cycle
Wood Replacement and Paint	To be determined				
Roof Drainage Gutters and Downspouts.	Replacement of gutter assembly. Estimate: 335 lf @ $15.00 / lf = $3,525.00				

* This is a rough budgetary estimate and should be verified along with the document prep and as the scope of work develops for the overall project.

Conclusion:

The existing roofing materials for the referenced roof areas at the Seige Museum are near the end of their life cycles and are in need of replacement. The areas may have a few years of service, however continued repair work can be expected. The existing roofing and related components have had repairs at specific areas in an effort to maintain the weatherproof integrity of the facility. The roof areas should be scheduled for replacement as soon as possible and as the facility programs develops. This is a grand structure and good design and specification is necessary along with a quality installation.